ASA BULLETIN

AUGUST, 1930 NUMBER 52

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PUBLISHED MONTHLY FOR THE SUSTAINING MEMBERS OF THE AMERICAN STANDARDS ASSOCIATION, 29 WEST 39TH STREET, NEW YORK

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Specifications versus Brands in the Purchase of Lubricating Oils

A Description of the Methods Employed by Three Public Utilities in Purchasing Lubricating Oils

Because of the importance to many of the Sustaining-Members of the American Standards Association of the purchase of lubricating oils, an effort was made to learn the practices of organizations purchasing large quantities of such oils. With three companies supplying information, three different general methods of purchasing oil were found to be used by these companies, largely because of differences in requirements.

The Philadelphia Electric Company purchases its oils exclusively on a specification basis. The Detroit Edison Company, on the other hand, finds that, because of its special problems, the specification technique is not applicable to lubricants. Because this company has done more than almost any other to place most of its purchases on a specification basis, its experience is especially interesting. A third company, the Public Service Electric and Gas Company of Newark, combines the use of specifications with performance tests in making its purchases.

For the information of ASA members, the specifications of the Philadelphia Electric Company are presented herewith. These are followed by descriptions of the methods employed by the Detroit Edison Company and the Public Service Electric and Gas Company in purchasing lubricants.

Oil Specifications Used by the Philadelphia Electric Company

The Philadelphia Electric Company specifications for lubricants for steam turbines follow:

General

1. These specifications cover the grades of petroleum intended for use in the lubrication of horizontal steam turbines provided with a circulating and forced feed system.

2. The oil shall be a pure petroleum product, properly refined to make it suitable in every way for the uses hereinbefore specified; it shall be a new oil made without the admixture of any fatty oils, resins, soaps, or any other compounds not derived from crude petroleum.

Properties and Tests

3. All tests shall be made in accordance with the methods for testing lubricants as outlined below:

4. Flash and Fire Points—The flash and fire points, open cup, shall have the following minimum values:

Flash	315° F
Fire	355° F
A.S.T.M. Method,	D92-24
Bureau of Mines Method, Paper 323-B, Method	110.32

5. Viscosity—The viscosity, in seconds, Saybolt Universal, shall be as follows:

Limits at 100° F	135–165 secs.
Minimum at 210° F	40 secs.
A.S.T.M. Method,	D88-26
Bureau of Mines Method, Paper 323-B, Method	30.41

6. Pour Test—The maximum pour test shall be 40° F A.S.T.M. Method, D97-27T, Bureau of Mines Method, Paper 323-B, Method 20.12.

7. Neutralization Number—Oil shall be absolutely free from mineral acid, and the organic acidity, expressed as the amount of potassium hydroxide required to neutralize one gram of the oil, shall not exceed 0.05 milligram.

A.S.T.M. Method, D188-27T.
Bureau of Mines Method, Paper 323-B, Method 510.31

8. Corrosion—A clean copper strip shall not be discolored when submerged in a sample of the oil for three hours at 212° F Bureau of Mines Method, Paper 323-B, Method 530.31.

9. Steam Emulsion Test—The oil shall be tested by the A.S.T.M. steam emulsion test. The time required for separation of 20-CC of oil shall not be greater than 40 seconds.

A.S.T.M. Method, D157-27

10. Oxidation Number—The oxidation number (formerly known as the Sligh Oxidation number) shall not be greater than 30. The oxidation number shall be determined by the method used at the Bureau of Standards in 1926 and known as the oxidation number of

mineral oils which may be obtained from the Bureau of Standards. The test procedure also appears in the appendix of the Report of Committee D-2 of the A.S.T.M. for 1927.

Commenting upon this specification, Mr. N. E. Funk, vice-president in charge of engineering of the Philadelphia Electric Company, says:

> "After the required viscosity of the oil has been determined, I believe the next important properties are the resistance of the oil to emulsification and resistance to oxidation. Other tests indicated by our specifications are for the purpose of checking uniformity of shipments and with a view to the elimination of any property which might discriminate against a crude.
>
> "Our specification limitations for steam emulsion values and oxidation values are based upon criteria established by the sludging machine in conjunction with service performance. It is generally our practice when considering new oils with which we are not familiar, to first subject the oil to the sludging machine test in order to ascertain whether or not the criteria for acceptance tests are justified.
>
> "All the tests referred to in our specifications are standard tests of the American Society for Testing Materials with the exception of the Sligh Oxidation Test. This test, while looked upon with favor by the American Society for Testing Materials because of its reproducibility, has not been adopted as tentative or standard for testing turbine oils, since its relation to service performance has not been (in the opinion of Committee D-2, A.S.T.M.) satisfactorily established.
>
> "At the present time, Sub-Committee 11 on Turbine Oil, of Committee D-2, has an investigation under way with a view to establishing a satisfactory oxidation test as an index to service performance, and the Sligh Test is among the several tests being investigated.
>
> "The Sligh Test has its advantage over many oxidation tests on account of the time required for making the test. It can be completed in an eight-hour day, whereas other oxidation tests require several days."

How the Detroit Edison Company Buys Oil

by C. H. Fellows, *Chemist*,
Research Department,
Detroit Edison Company

The question is frequently asked: "Why do we not purchase turbine lubricating oil on specifications?" Perhaps the chief reason is that we do not fully understand all the factors involving oil quality, and those we do appreciate, as criteria, have not lent themselves to satisfactory measurement.

By experience, the power plant engineer has found that some branded oils give a certain degree of satisfactory service in steam turbines. The fact that the same degree of satisfaction is not experienced by all engineers upon the use of a specific brand of oil does not appear to alter the opinion of those who find that oil to adequately meet their requirements. The result is that, in general, each engineer has his own brand of turbine oil which seems to meet his needs, and that there are really a large number of branded oils that are rendering satisfactory service. Since this company has, by experience, proved to its satisfaction that one particular brand of turbine oil adequately meets its needs, it merely checks the constancy of quality in successive shipments by such established tests as the specific gravity, viscosity, steam emulsion, and Sligh oxidation tests.

Some years ago the N.E.L.A., through properly appointed committees, set out to learn why turbine oil of the same brand gave satisfactory service in the hands of some operators and not in others. The result of these studies revealed a wide variety of conditions of use. Different temperatures, different pressures, different machinery speeds, large and small steam and water leaks, together with a variety of schemes of reconditioning were found. It also developed that the nature of the unsatisfactory service was the formation of sludge and emulsions. It was also found that all oils developed organic acidity in varying amounts. Continued study indicated that oxidation of the oil itself was probably the most direct cause for the variations in service observed.

Oxidation of oils results in the development of acidity and sludge, and renders the oil more easily emulsified. The degree to which oxidation progresses is a function of the type of hydrocarbons that constitute the oil used, the degree of refinement to which the oil has been subjected, and the conditions under which the oil is used. The influence of each of these factors on the oxidation of oil is at present the subject of investigations by chemists throughout the world.

Such studies along this general line as are in progress have indicated that polymerization of the hydrocarbon molecule, as well as oxidation, is a factor in the deterioration and varying serviceability of oils.

The exact influence of all these factors must be evaluated before we can prepare specifications that adequately define the qualities we desire. Although the oil refiner has made marked

progress in the development of oils that resist oxidation, the consumer still lacks adequate laboratory methods for evaluation by which he can with assurance differentiate between these better refined products. One public utility organization has substituted tests by which that organization appears to be capable of measuring the inherent tendency of oils to develop oxidation products. The test methods so used are empirical and are thought by some investigators to be too inexact to be used generally in the selection of lubricants.

There are in the process of investigation by the A.S.T.M. and N.E.L.A., various kinds of oxidation tests of the "Long-time" and "Short-time" variety. It is expected that the result of these investigations will be the selection of a test of oil quality that may be generally adopted in the selection of turbine oils. Until a test of this type is found, the ultimate selection of turbine oils by the consumer must be made strictly on the basis of service tests.

A second consideration in the purchase of turbine oils on such specifications as are now available involves the cost. Turbine oils are listed from about thirty cents per gallon to ninety cents per gallon. The price range is at least to some extent indicative of a similar range in quality although, with respect to the results of certain oxidation tests, oils of excellent quality appear in the lower price class. If all oils of an apparent high quality could be mixed indiscriminately without regard to source of crude, the ideal condition would exist. However, it is not believed to be a safe proposition for the continuance of proper lubricating service to so mix oils. Therefore, each new brand of oil purchased must be put into a thoroughly cleaned system. This involves not only the cost of cleaning the system, but also the cost of the oil drained from the system. In those cases where satisfactory service is experienced with one or two brands of oil, it is considered safer and more economical merely to be sure the shipments of new oil received from time to time are alike in those characteristics now considered as adequate for purposes of comparison.

Purchase of Oil by the Public Service Electric and Gas Company

by V. M. Frost,
Public Service Electric
and Gas Company

The manufacturers are advised that we wish an oil for turbine lubrication with a viscosity of approximately 150° Saybolt at 100° F with a high demulsibility.

In submitting a sample, the manufacturer is requested to state his own limits of tolerance within which all samples of oil which would be furnished under a contract would comply, such as, specific gravity, viscosity, flash point ° F, fire point ° F, maximum acidity, and demulsibility.

Upon receipt of a sample, it is analyzed by our laboratory for compliance with the manufacturer's own specification as to the usual physical properties noted above and then put through a further series of accelerated laboratory tests simulating service conditions to determine so far as possible the probable behavior of the oil in service.

If the results of these tests are favorable, a further service test is usually made in an operating turbine to obtain further information regarding the performance of the oil.

The result of all these tests determines the oils which the department will consider for use in the various plants.

In a sense, then, you will note that we do not purchase on specifications issued by us but rather upon the specification furnished by the manufacturer as to the quality which he expects to maintain in his product, which product we have determined by our own tests will prove satisfactory for our service.

Research Vital in Maintaining Standards

"One of our strongest defenses, and one of the features of our industrial life which Europeans find most impressive, is the formidable volume of research in pure science as well as in industrial technology which is financed and fostered by an increasing number of long-sighted corporations.

"Constant betterment of our methods must go hand in hand with resolute determination to maintain the quality and standards of our goods. Mere cleverness, either in a man or in his merchandise, cannot long be successfully employed as a substitute for sturdy character. The farther away we send our goods, the greater is our obligation to stand behind them. Any other policy is foredoomed to failure."—From editorial, *Saturday Evening Post*, March 15, 1930.

Diesel Publication Available

The Diesel Engine Manufacturers' Association has prepared a sixty-page booklet entitled "Standards of the Diesel Engine Manufacturers' Association." This booklet includes chapters on: standard principles of business, standard practices, notes on the selection and installation of stationary Diesel engines, and standard definitions. Sustaining-Members of the ASA interested in Diesel engines may obtain a copy for review through the ASA Information Service.

New York State Profits by Purchasing under Standards and Specifications

The second annual report of the Division of Standards and Purchase of the State of New York, issued in January, 1929—the sixth annual report on centralized purchase in this state—contains information of interest to those engaged in purchase under specifications. The following pertinent quotations are taken from this document:

> "Knowledge is the preliminary requisite to standardization. The individual with technical, scientific, and practical knowledge of all supplies to be purchased does not exist. The variety of commodities to be purchased excludes the possibility that any one person or any corps of assistants employed under necessarily limited State appropriations could have first hand knowledge of every problem to be handled. It was necessary therefore to coordinate all available sources of information and the State has progressed in establishing a scientific and practical system. . . .
>
> "The advantages apparent after six years of centralized standardization and purchase are surprising even to those enthusiasts who fathered the legislation at its inception.
>
> "Standardization and bulk purchasing has brought about stabilization of quality by an assurance of uniformity in the supplies regularly furnished to the State agencies, and has given the small institutions the advantages formerly possessed only by the larger. The systematized presentation of the State's needs in accordance with trade custom and the elimination of countless sizes and brands for the one purpose result in a proposal sheet that will attract the attention of any manufacturer. The local dealer, however, is on a footing with the wholesale jobber, his prices and standards being equal, for the regulations provide that bids may be submitted for any one or all agencies, or for one or more items as the case may be. . . .
>
> "Practical tests demonstrate the practicability and adaptability of a commodity and the results of such tests are at the service of all. An article may be economical as to cost but wholly impracticable for use. It proved an expensive operation to have many State agencies each demonstrating this fact at public expense when, through centralization, a preliminary test establishes the result for all.
>
> "These scientific tests work to the advantage of the State's agencies and the contractor as well. For the former, it insures a standardized product at a reduced cost; and to the latter, a concentrated, equalized basis of competition. Previously the various agencies used fifteen to twenty different brands of washing soda ranging in quantity annually from fifty to fifty thousand pounds. Today a standard is established for this product which must meet a fixed chemical analysis and insure certain results and the quantity is bulked and purchased at about 50 per cent of the former cost. . . ."

Here follows a discussion of the question of standardization and classification of coal supplies, of which the State buys almost 300,000 tons a year. Quotation from this section is limited to the following significant item:

> "In view of the quantity used any small saving in the cost of coal becomes a material item. The average cost of bituminous coal dropped from $5.23 per net ton delivered in 1923 to $4.437 in 1928, although the standard was raised to cover a higher quality of coal, and the trade in general did not reflect this decrease. The average price of anthracite coal increased from $6.67 to $6.89 per gross ton delivered—an increase of .22 per ton, but an actual decrease, when compared with trade increases. . . ."

The report proceeds with further instances of the use of specifications:

> "The standardization of laundry machinery is one of the big accomplishments to the credit of the Division. . . .
>
> "That the laundry machinery specifications have been brought to a high standard is evidenced by the fact that they are approved by manufacturers and that several states including Massachusetts and Pennsylvania as well as Federal divisions have adapted them to their uses. They call for safeguards and protection beyond the requirements of the Labor Department's Division of Industries. A check-up on

actual installations has developed improvements which have been incorporated in the specifications and which the trade in general has been quick to adopt.

"Contracts amounting to approximately $1,000,000 have already been awarded and a careful study of previous costs of such machinery shows a saving of nearly one-third on these particular contracts, in addition to the fact that the machinery now being purchased is at least equal in quality, as economical in operation, and far superior in safety features and simplicity of operation.

"With modern and more economical methods being constantly applied to the operation of State institutions, the necessity of installing dishwashing machinery in several of the larger institutions was clearly established. This Department made careful and exhaustive investigation of the many types of dishwashing machinery and has prepared standard specifications for the purchase of all such equipment to be used in State institutions.

"The Bureau of State Institutions Farms of the Department of Agriculture and Markets has cooperated with this Department in the standardization, purchase, and inspection of cattle feed, fertilizers, and potatoes. Their expert knowledge placed at our disposal is much appreciated. . . .

"The State expends large sums of money in the purchase of foodstuffs and supplies for its various agencies. It is essential therefore, that the State be protected at all times against inferior deliveries. Experience has proved that sub-standard products are rather common on the market, and with this in mind the Division of Standards and Purchase through its chemical laboratory and cooperation with the various State agencies is constantly on the look-out for such cases."

The report contains a classified list of commodities, extending to seven pages, for joint contract and central purchase, which may be of interest to other large buyers. It also includes an extensive tabulation showing quantities, total costs, and average prices paid for 1927 and 1928, covering a large variety of goods which may be of interest to the purchasing departments of our Sustaining-Members who wish to make price trend studies on commodities included in this report. A copy of the report can be had without charge on application to the New York State Department of Standards and Purchase; or the American Standards Association will be pleased to lend one for examination to interested companies.

Better Municipal Purchasing Urged

The establishment of a municipal buying organization in the city of Syracuse, New York, was recommended in a recent report, by the School of Citizenship and Public Affairs of Syracuse University. In an article in the December 1929 issue of *American City Magazine*, Paul V. Betters, instructor in the School of Citizenship and Public Affairs and secretary of the Municipal Research Commission of Syracuse, New York, points out that most of the recommendations would apply to any city that has not yet adopted modern practices in the purchasing of supplies, materials, and equipment. The report recommends the use of specifications for many municipal purchases, followed by careful inspection and tests.

The following are excerpts from recommendations as summarized by Mr. Betters in his article:

"*Standardization and standard specifications*—Not all commodities used by a city can be standardized. Many special or technical materials should be purchased without attempting to standardize. However, municipalities consume many staple articles such as coal, lubricating oil, furniture, stationery, and equipment that should be standardized. In addition, standard specifications should be drawn in order that the city may not be forced into trade-mark buying. There are definite advantages in standardization beside price reduction, in the direction of simplification of office work, decreased overhead costs, and the possibility of transfer among departments. As long as departments are permitted to order the type of supplies or materials that are desired, disastrous results are bound to occur as far as economy in expenditures is concerned. In order to provide for a definite plan in this respect for the city of Syracuse, a standardization board composed of the purchasing agent, commissioner of public works, city engineer, and comptroller is recommended. St. Louis, Baltimore, and Portland, Oregon, have established such boards with marked success. Specifications are also available from various sources, chief among which is the Federal Specifications Board in the Bureau of Standards. . . .

"*Inspection and tests*—A careful system of inspections provides assurance that the city is receiving merchandise for which it contracted. Facilities are at hand for testing, and the city is urged to establish a thorough system of inspections and tests."

Specifications Promote Efficiency in Buying for Schools

The importance of using standards and specifications in buying for school systems was pointed out in an article, "Economy Through Efficient Business Management," by H. P. Shepherd, in the *American School Board Journal* for February, 1930. Excerpts from this article follow:

"One of the greatest wastes lies in the purchase of supplies. To this end, supplies should be standardized and purchased according to exact specifications on competitive bid basis. Orders should be placed early enough to avoid peak production demands, higher prices and later deliveries. A close checking should be made of deliveries against specifications..... Many cities are discovering the tremendous economies lost through structural defects. Vast amounts of public money could be saved through the development of a quality standard of workmanship.....Since fuel is the biggest item in the operation of a plant the coal should be paid for on the basis of heat-unit standards. This method will prevent poor coal being dumped on the school and will prevent overrunning the amount set up in the budget if weather conditions are not abnormal.....

"City D discovered by close check-up that window washing took something like four days. This seemed too long, and after finding out the material used by the janitorial force—it happened to be a widely advertised household preparation—he substituted denatured alcohol. Now windows are cleaned in less than half the time.....

"City H has improved very much the buying, has standardized everything and published standard lists of all supplies. 'Our method of ordering has been improved, and our delivery service is 100 per cent better than formerly.'.....

"City M reports centralized buying and standardization of supplies as a means of effecting economies.....

"City I is contemplating the organization of a cooperative purchasing association, which will investigate the quality of various articles by tests, analysis, etc., and secure better prices by larger volumes of purchases.....

"City E reports that 700 seats had to be rejected as they did not meet the specifications as to weight, quality or curving. Slate blackboard was delivered on the job for No. 1 quality and, after a long argument extending over two months, the company met specifications. Window glass in the door was not plate as designated by the specifications. By such a method of checking, local as well as national supply firms soon came to learn that the school system of this city could not be exploited in such a manner.....

"City H writes: Under the present superintendent, shopwork has been reduced to those things which are profitable for the board to handle. We do not manufacture as much furniture as we did, but repairs and upkeep have been very much improved. It is my judgment that any city of considerable size can scarcely afford not to have a headquarters building for storage, shop and repairwork. There is scarcely any way to profitably supervise and standardize without a central building."

Purchasing Agents See Need of Specifications for Textiles

Greater use of standard specifications in the purchase of textiles is urged by G. W. Gregory, purchasing agent of The Keratol Company, in the September, 1929, issue of *Purchasing Agent*. Pointing out that purchasing agents in other industries can purchase in the open market according to generally adopted specifications, Mr. Gregory says that such specifications do not exist in the textile industry, except for specifications of individual mills.

"Is it fair," asks Mr. Gregory, "to assume that most manufacturers have a disregard for definite specifications? Also, are there industries wherein manufacturers are reluctant to establish definite specifications for any particular reason?

"An attempt to review part of the textile industry—that is, the grey goods sections—does not give one any feeling of direct confidence about what is being purchased, or what is going to be received. Buying hesitancy is sometimes construed as weakness, and therefore momentary weakness oftentimes develops, but buying hesitancy on the part of purchasing agents engaged in buying grey goods is not weakness, but oftentimes lack of confidence, due to the weakness of the main structure with which they are dealing.

"It is possible to purchase in the open market, any of the various kinds of steel, to specifications which have been laid down and adopted by steel manufacturers, not

only here in the United States, but abroad. All the automotive steels are being governed by specifications drawn to the Society of Automotive Engineers or S.A.E. standards.

"This is also true of the wire industry, either steel, brass, or copper. The alloy content is specified, and the size of the wire conforms to standard gages.

"In the textile industry, there do not appear to be any standards to cover any of the various standard textiles, except those standards adopted individually by the respective mills. All specifications differ in some respects, and an effort to analyze them leads one to confusion. There are mills which make certain definite qualities to meet their respective customers' requirements, but as these are of a special nature they cannot be considered in this discussion.

"It is impossible to make a product such as grey goods and have it hold, and deliver it a specified width, but there should at least be some defined uniform tolerances. . . . .

"The warp and filling count is considered by most buyers of grey goods as one of the most important details in cotton piece goods manufacture, contingent, of course, on the correct size of yarns being used, as it controls the real strength of the entire structure. It has become of such consequence that the better class of mills have made obsolete their old equipment which could not be depended upon for actual warp and filler count of yarns, and have installed looms with what is known as feeler motions, on which the actual number of threads woven to the square inch are moved into place by feelers attached to the weaving apparatus. Thus consecutive yard for yard count will be identical, and it is possible to weave long cuts of uniform quality.

"As long as no sharp practice is indulged in," continues Mr. Gregory, "this is making goods to specifications, but the fact remains that a premium is asked for this class of merchandise over and above the general mill run of goods on other looms, yet mill men will state that the goods are easier to make, greater production is obtained, and rejects or seconds are less in volume. Possibly the premium is asked as a carrying charge for new equipment. In cases where the finished fabric is to be subject to stress or strain in the direction of either warp or filler individually, the dropping of threads from the count weakens it considerably, and a premium to obtain goods to specifications pays in the long run on quality, as against price; but still the question remains as to why it should be necessary to pay the premium."

Department Store Wants More Textile Standards

The *Bulletin* of the Laundryowners National Association of the United States and Canada quotes Ephraim Freedman, director of the Bureau of Standards of R. H. Macy and Company, Inc., as saying in an address before the National Association of Cotton Manufacturers, that:

> "Standards should be created for all materials. These should include minimum specifications for yarns, piece goods, and manufactured articles. They should embrace tests, the results of which will convey to the ultimate consumer the desired information.
>
> "Many of you present may claim that such a procedure will build up sales resistance because of consumer doubt. I must emphatically state, however, that I cannot agree with you, because we have experimented and we are in a position to know.
>
> "Two years ago we notified our public that we did not guarantee the wearing qualities of transparent velvets. Ladies who considered the life of the garment more important than style bought other merchandise. The sale of transparent velvets, however, increased by leaps and bounds, and the complaints dropped to nil."

Present Paper Standards Found Inadequate

The standardization of printing and writing papers was discussed in a paper presented by a member of the staff of the United States Bureau of Standards before The American Society of Mechanical Engineers at the June, 1930, meeting. The paper pointed out that standards now in use are inadequate because they are based primarily on fiber requirements which may have no relation to the aging quality of the papers. It was shown that the processing of the fibers and other paper making operations are important factors in determining the deterioration-resisting properties of papers. Since the strength of paper and its purity depend upon these various factors, it was suggested that classification be based primarily on strength and purity. Four classes of paper would be used—permanent papers, papers having a minimum life of 100 years, papers having a minimum life of 50 years, and papers for temporary use.

New Electrical Standards and Drafts Issued by A.I.E.E.

The following new and revised standards of the American Institute of Electrical Engineers are now available in printed form. It is stated in the preface to these standards that the chief purpose has been to define the terms and conditions which characterize the rating and behavior of electrical machinery and apparatus with special reference to the conditions of acceptance tests.

No. 12, Constant Current Transformers, May, 1930 (price 30 cents). This standard covers constant current transformers of the moving coil type, which are used chiefly in series lighting circuits. The changes made in the present draft are the results of suggestions received since the circulation of the draft in June, 1929.

No. 13, Transformers, Induction Regulators, and Reactors, May, 1930 (price 40 cents). This is an extensive revision of the August, 1925, edition of the same standard. It covers transformers in general (exclusive of instrument, auto-starter, rectifier, constant current, testing, radio, and small and special transformers), induction regulators, and reactors. The new material consists largely of definitions of grounding transformers and of types of transformers, methods of loading for temperature tests, methods of determining momentary load limitations, methods of measuring losses, and changes in dielectric test voltages.

No. 100, Recommendations for the Operation of Transformers, June, 1930 (price 20 cents). The preface to this standard reads as follows:

> "Recognizing the economic importance, and the demand on the part of users of large expensive apparatus of obtaining in service outputs greater than the test rating as defined in the A.I.E.E. Standards, the Institute is issuing this pamphlet which furnishes a guide on the operation of transformers in service, where operating conditions are different from those specified in the Standards for acceptance tests.
>
> "Also, recognizing the difference in maintaining the temperatures continuously at the maximum value by means of allowing overloads and of reaching the maximum temperature occasionally under usual service conditions where the test rating is never exceeded, the A.I.E.E. establishes for the first time a temperature differential of 10° C in the recommended maximum temperatures for the two kinds of service.
>
> "These recommendations on operation are published as an individual pamphlet in order to distinctly separate them from the material used as the basis for the purchase of transformers as contained in the present A.I.E.E. Standard No. 13."

No. 20, Air Circuit Breakers, May, 1930 (price 30 cents). This standard applies to indoor alternating direct current air circuit breakers other than enclosed types. This final edition is identical with the draft which has been in circulation since June, 1928, except that the following definitions have been added: high speed breaker; trip-free-electrically and mechanically; interrupting rating; standard operating duty; and interrupting performance.

No. 26, Automatic stations, May, 1930 (price 30 cents). This is a revision of the April, 1928, edition. The revision consists of changes in the list of device function numbers and of changes in the table showing minimum protection for power apparatus.

The above-mentioned standards are available for loan or may be purchased through the ASA Information Service.

The following two draft standards have been printed by the American Institute of Electrical Engineers and are being circulated for criticism and comment:

No. 16, Railway Control Apparatus, May, 1930. This is a proposed revision of that part of ASA Project C36-1928, Railway Control and Mine Locomotive Control Apparatus, for which the A.I.E.E. was granted proprietary sponsorship (C48). The revision is being made under the proprietary procedure and will be presented to ASA for approval upon its completion by the sponsor. The material covers control apparatus for all electric railway applications, including trackless trolleys or vehicles in which electric motors are used for propulsion.

No. 18, Capacitors, May, 1930. This is a proposed standard for capacitors of the following types: capacitors for power applications such as power factor correction, high frequency induction furnaces, and capacitor motors; resonant shunts (filters); blocking capacitors; coupling capacitors; and for power oscillator circuits.

These last two reports may be obtained free of charge through the ASA Information Service.

Canadian Electrical Code

Copies of the 1930 edition of the Canadian Electrical Code, published by the Canadian Engineering Standards Association, have been received at the ASA office and may be borrowed for review by those interested, or purchased for 25 cents per copy.

A preface to the code states that:

> "These Rules and Regulations have been prepared with due regard to recognized elec-

trical codes now in force, particularly the 'National Electrical Code' (ASA, C1-1930), 'National Electrical Safety Code' (ASA, C2-1927), and 'Rules and Regulations of the Hydro-Electric Power Commission of Ontario.' It is felt," by the C.E.S.A., "that subject to future periodic revision, the adoption of a uniform code by all Canadian Provinces will be a forward movement and will ultimately establish national standards in both installation work and material, besides eliminating the present differences and promoting safety and economy."

Under the heading "Scope and General Arrangement" the code says:

"The Rules and Regulations govern all electrical work and equipment (operating, or intended to operate, at potentials up to 5,000 volts, inclusive) in electrical installations for buildings, structures, and premises —with the exception of car-wiring, work in mines, and marine work."

The code also contains a cross reference list showing changes made in the previous edition.

National Electrical Code Upheld by Court

Industrial Engineering for February, 1930, editorially reviews the case in which the Supreme Court of Alabama based its decision upon the recognized authority of the National Electrical Code. An office building of the Alabama Power Company was wired by a local electrical company. Later the contractor hired to wash and polish the floors of the building used steel wool and gasoline in doing the job. While one of the contractor's men was working around an electrical floor connection, a flash ignited the gasoline, fatally burning the man.

"The Supreme Court of Alabama held," according to *Industrial Engineering*, "that the type of floor fixture alleged to have been negligently maintained is shown by the undisputed evidence to be known as an 'Edison base-type receptacle.' The use of this type in floors is forbidden by the National Electrical Code for Interior Wiring. Evidence went to the effect that this Code is the standard and is used by all competent wiremen. . . . .

"In connection with such evidence, the Code, being the expression of the matured judgment and experience of men in that business, becomes evidence of correct appliances for such places, and evidence that the use of fixtures forbidden by it is negligence."

The editorial then states:

"It will behoove those responsible to see that electrical work is executed in accordance with the provisions of this Code, except when permitted by competent authority to do otherwise. Cutting corners by disregarding some of these provisions may be momentarily profitable in time or money, but if a day of reckoning comes it may be found that small profit has been very dearly bought."

New Electric Gaging Device

Readers of the ASA BULLETIN interested in dimensional gaging problems may wish to get into touch with the General Electric Company in connection with its electric gage, an accurate gaging device operating through a circuit terminating in an electrical indicating element (ammeter). It is reported (*General Electric Review*, December, 1929) that one of these gages held its calibration through measurement of nearly 60,000 holes. A feature of particular interest is the openness of the scale, since the instrument gives a full scale deflection for a diameter variation of 0.0005 inch. One ten-thousandth inch gives a scale deflection of an inch on the ammeter. We mention this instrument in the realization that in large measure the extension of the use of limit gaging systems in manufacture will depend upon the ease, reproducibility, and convenience with which precise measurements can be made under production conditions.

A copy of the article in question may be borrowed for study from the ASA office by Sustaining-Members who are interested, or the General Electric Company may be addressed for more detailed information.

Theatre and Studio Sound Equipment

A standard of special interest recently received at the ASA office is that for "Sound Recording and Reproducing Equipment" issued by the Underwriters' Laboratories. The standard sets minimum safety requirements for sound recording and reproducing equipment for use in theatres, studios, and similar locations by qualified operators in accordance with the National Electrical Code (C1-1930). Copies may be ordered either direct from the Underwriters' Laboratories, or through the ASA Information Service.

New Standards Published by British Association

Copies of the following new British standards published by the British Engineering Standards Association have been received in the ASA office, and are available for loan or purchase through the ASA Information Service:

B.E.S.A. Specifications 372–1930 "Side Entry Wall Plugs and Sockets for Domestic Purposes." This standard supersedes number 73–1927 "Hand-Shield and Side-Entry Pattern Two-Pin Wall Plugs and Sockets" and number 317–1928 "Hand-Shield and Side-Entry Pattern Three-Pin Wall Plugs and Sockets." (This type provided grounding pins.) The new standard contains only minor additions to the two standards which it supersedes, and a more comprehensive revision is under consideration.

B.E.S.A. Specifications 33–1930 "Carbon Filament Electric Lamps." This standard contains definitions and standard specifications for British Standard Carbon Filament Electric Lamps, schedules for carbon filament lamps, and an appendix which shows an example of the computation of the results of life performance.

B.E.S.A. Specifications 126–1930 "British Standard Specifications for Flame-Proof Air-Brake Switches With or Without Fuses" for voltages not exceeding 660 and suitable for use in the mining industry. The standard contains general definitions for switch gear, standards for design and construction, ratings, sizes and markings, tests, and notes on the problems of flame-proof enclosures. It is not intended to include switches for series motors, circuits of high inductance, or traction circuits, which may require a higher rupturing capacity than is specified.

127–1930 "British Standard Specifications for Flame-Proof Air-Brake Circuit Breakers" for voltages not exceeding 660, suitable for the requirements of the coal mining industry. This standard is similar in content to B.E.S.A. Specifications 126–1930 above, but it should be noted that "in the British Standard Specifications the following distinction is made between an Isolating Switch, a Switch, and a Circuit Breaker. An Isolating Switch is intended only for interrupting the circuit when there is no load-current. A Switch is suitable for breaking a load-current: and a Circuit Breaker is suitable for interrupting abnormal conditions such as that of short circuit."

91–1930 "British Standard Specifications for Electric Cable Soldering Sockets." These specifications cover dimensions, carrying capacity, and so forth, of hot pressed or cast lugs, lugs formed from tubular stock, and lugs which are provided with clamps. The lugs covered are suitable for use on cables from 0.003 to 1.000 sq. in. sectional area.

384–1930 "British Standard Specifications for Hard-Drawn Phosphor Bronze Wire" used primarily for armature binding. These specifications cover "methods of manufacture, quality of material, chemical test, freedom from defects, heat treatment, margins of manufacture, provision of test pieces, mechanical tests, (a) tensile test, (b) bend test, (c) test for adherence of tin coating, re-tests, testing facilities" for the type of material indicated by the title.

B.E.S.A. Specifications 380–1930 "British Standard Specifications for the Performance of Desk Type Electric Fans." According to the Introduction to this publication

> "the object of this Specification is to define certain features relating to the performance of small propeller-type fans which may be used for desk fans, wall fans, and other similar purposes, and to regulate the method of testing these fans so that the results of tests will be comparable.
>
> "The type of fan under consideration is designed to rotate in free air and to produce disturbance of the air in the room in which it is made to operate. This air disturbance may or may not be modified by a mechanism attached to the fan, causing oscillation of the motor and blade system, and so producing a continual cyclical change of direction of the axis of the draught.
>
> "For the purpose of testing for the air delivery of the fan, any oscillating mechanism must be put of action.
>
> "It is considered that the air delivery per watt of input is a better indication of the service value of this type of fan than a determination of the overall efficiency, i.e., the ratio of the actual power output to the power input.
>
> "The maximum air velocity and its distance from the axis of the fan should be considered in conjunction with the air delivery."

Czechoslovakia Seeks Standards for Perforated Plates

The Czechoslovakian national standardizing body has asked the ASA to find out whether any organizations in this country are interested in the standardization of perforated plates. Any members of the ASA using standard designs and dimensions for perforated plates or aware of the existence of standards or draft standards in this field are invited to advise the Czechoslovakian body on this subject through the ASA office.

Germany Standardizes Railway Cars

The standardization of railway cars has been developed to a high degree in Germany, especially in the manufacture of the component parts as interchangeable units which can be used for as many types of cars as possible. It has been found that such interchangeable manufacture materially lowers both the production cost and the cost of repairs. Thus far standardization and interchangeable manufacture have been applied to all standard freight cars and to two types of passenger cars. There are now in operation 25,824 freight and 3115 passenger cars, assembled of interchangeable component parts, according to a recent issue of *RKW Nachrichten* (the official publication of the German Federal Commission on Public Economy).

The degree to which the unification of car parts has progressed may be seen from the following examples:

The gondolas for 20 tons net weight, with a handbrake, have a total of 1911 component parts of which 975 parts are suitable for all standard freight cars; 444 parts, for all gondolas with or without a handbrake; 255 parts, for all gondolas with a handbrake; 237 parts for three to six other types of cars.

In the case of box cars, for a net weight of 15 tons, with a handbrake, composed altogether of 2255 parts, there are 1148 parts suitable for all standard freight cars; 71 parts suitable for box cars with a handbrake; 405 parts for box cars with or without a handbrake; and 601 parts for three to six other types of cars.

It is furthermore stated in the German report that, independent of the requirement that the parts must be interchangeable, economy in the production of steel cars—assuming that the number of cars to be manufactured be large enough—demands the drilling of the rivet holes, as any other process requires a larger number of operations. If the drilling devices are made with the degree of accuracy required for interchangeability of a part, manufacturers can equip themselves with a special view to economical production of certain parts, and consumers are able to order from any manufacturer and assemble the parts without difficulty.

Also, the construction of the cars has been much improved as compared to the old method of manufacture. The maintenance of the manufacturing limits specified guarantees that the assembling of the cars occurs with the desired degree of accuracy. Considerable improvement of the construction results from the rivet connections between interchangeable parts automatically having the required strength.

The interchangeable parts are also used for older cars which have not yet been built to the standard type. They are used, if possible, whenever repairs must be made or when a change in the construction of the cars has become necessary, for example, increasing the strength of the drawbars.

Uniformity of American Product Sells Steel Abroad

A prominent engineer and corporation executive in a discussion in a meeting held some time ago in connection with The American Society of Mechanical Engineers stated that, although American structural steel costs more abroad than European steel, it was possible to construct buildings, using the American product, at a smaller total cost on account of its higher uniformity which permits the factor of safety required to compensate for irregularities in composition, dimensions, etc., to be somewhat reduced. The same man reported the case of an Englishman who spoke with some irritation of the high prices charged by American manufacturers for a certain steel which he used in machine production processes, and when asked why he did not buy a locally made steel to save this extra money, explained that he preferred to pay the higher price for American steel because its great uniformity of composition and quality markedly reduced manufacturing costs and simplified tooling and inspection difficulties throughout the plant.

A high degree of uniformity of raw materials and semi-finished goods is an essential quality in mass production machine processes. A change in hardness, stiffness, resilience, thickness, finish, etc., outside of exceedingly narrow limits, may occasion very serious problems in the uninterrupted and trouble-free operation of machines and machine tools. Even in the coarser manual operations like plastering, a change in the consistency or tint of the medium is the cause for serious difficulties in execution and the danger of rejection of work.

German Thread Standards

A group of German national standards for metric and Whitworth threads has been received at the ASA office and copies are available for loan or sale through the Information Service.

The standards contain tables for general dimensions, and for tolerances, fine, medium, and coarse.

French Body Adopts Standardization Principles

A set of principles of standardization has been adopted by the French Bureau de Normalization de L'Automobile, a body similar to the Society of Automotive Engineers in this country. These principles as quoted by the *S.A.E. Journal*, are:

"Observe good constructional principles, establishing always the perfection of the standardized article.

"Reduce the number of dimensions to a reasonable minimum and make them conform so far as possible to a standard series in geometric progression to which the parts are scaled approximately.

"Provide for interchangeability so far as economy permits in the nature of the commodity.

"Choose dimensions, so far as possible, which are used in practice.

"Assure the practicability of the standard.

"Do not refuse to consider a project merely because a long time might elapse before a standard could be adopted in practice.

"Keep the future in mind in carrying on the work.

"Work independently of commercial organizations; standards are for the general good and not for the accommodation of only a few interests.

"Do not insist too strongly on standardization which has only economy and usefulness as its principal fundamentals. Standardization should not be pushed to a point which makes further improvement impossible. Do not reduce the number of models so much as to unnecessarily restrict the users of the article.

"Do not insist too strongly on one or two principles to the exclusion of others which are of equal importance.".

German Body Submits Drafts

The following drafts on units, quantities for use in formulas, and nomenclature have been published by the German standards committee in *DIN-Mitteilungen*, No. 10, May 15, 1930:

DIN E 1313	Manner of writing physical equations
DIN E 1314	Units of pressure
DIN E 1324	Magnetic quantities
DIN E 1325	Types of connection of windings

The German Committee is interested in receiving information as to the American point of view on these subjects. Copies of the drafts may be borrowed for review through the ASA Information Service.

Federal Standard Stock Catalogue

The *Federal Standard Stock Catalogue*, preparation of which has been under way for some time (see item 1, ASA BULLETIN, number 42) in the office of the Chief Coordinator, Washington, has been published and distributed for use by the government departments. Sustaining-Members may borrow through the ASA Information Service a copy of the catalogue for review.

The catalogue is designed

"to list in orderly and classified arrangement all supplies regularly procured, stored, and issued by or for the various departments and establishments of the Government, and to furnish in the case of each item of such supplies the information necessary for procurement, storage, and issue. It is limited in its scope to such supplies. It is intended that this catalogue, when completed, shall include all items of supplies and materials necessary to meet the ordinary requirements of the various departments and establishments, except in the case of specialized technical materials, and requirements should be so regulated as to avoid, so far as practicable, orders or requisitions for articles that do not appear in the catalogue."

The Navy Department has used a standard stock catalogue for several years and a few large companies, notably the Detroit Edison Company, have also used such catalogues to promote efficiency in the procurement of supplies. The example of the government and of these few companies can profitably be followed by almost every organization requiring many types of supplies. A careful examination of the *Federal Standard Stock Catalogue* will prove of great value to such companies.

Reprint Available

Copies of an article by P. G. Agnew, Secretary of the American Standards Association, entitled "Standardization—A Woman's Problem," which appeared in the June, 1930, issue of the *Journal of the American Association of University Women*, are available and may be obtained free of charge through the ASA Information Service.

Standardized Nomenclature Important to Laundry Owner

We have had occasion to refer from time to time to the importance of nomenclature and its standardization as basic to the successful operation of much business and technical enterprise, but it is not often that so clear an illustration of the importance of nomenclature in a purely commercial sense is found as in the following quotation from an article by a well-known laundry owner (*Starchroom Laundry Journal*, April, 1930). Perhaps a great deal of advertising expenditure is wasted because of failure to define clearly what the product is that is to be sold.

> "Another thing which seems foolish to me is the fact that we were willing to contribute more than $5,000,000 to advertise our business and the nearest the copy could come to telling the customer what we had to sell was: 'A service to fit every family budget.' Nothing standardized, not even to names, and yet prior to the campaign the Laundry Owners National Association did adopt names which well could be standardized. Here are some of the names we find: Wet Wash, Damp Wash, Hydro, Damp Wash-Flat Ironed, Thrif-T, Thrifty, Rough Dry, Fluffed Dry, Damp Dry, Finished Family, Homestic, Prim-Pressed, All Prest, Model Finish, Tro-Peco, Pilgrim Finish, Carolyn Finish, Semi-Finish, Float Roll, Economy Service, Dry Wash. These from memory, there may be many more.
>
> "Why can't we standardize on names to designate a type of service and let our advertising define that service? Here we have twenty-two names to designate one of seven family services."

—

Standardization Prize Competition

In order to spread among printers the knowledge of existing standards for paper format and layout and to prove that there still are sufficient possibilities for individual and artistic execution of commercial printed matter, even though the established standards are rigidly adhered to, the Educational Federation of German Printers has offered 1000 marks as a prize in a competition between its members. The competition applies to standard letter heads, bills, envelopes, postcards, and business cards. As far as is known, this is the first prize competition in the field of standardization. It will tend to promote introduction into practice of the standards in question.

New Engineering Inspection Association Organized

The organization of the National Engineering Inspection Association, a body which should hold an important place in the standards and specifications movement, has recently been announced. The object of the Association, according to its constitution, is:

> "to promote a proper understanding and cooperation among those engaged in, and concerned with, engineering inspection; to establish practices which will prove beneficial to proper service; and to develop and encourage better and more effective inspection methods."

Its members will include individuals, partnerships, or corporations regularly engaged in the general practice of engineering inspection. The officers of the Association are: President, Watson Vredenburgh, president, Hildreth & Company, Inc., New York City; Vice-President, J. D. Stoddard, vice-president, The Detroit Testing Laboratory, Detroit, Michigan; Secretary-Treasurer, B. H. Witherspoon, president, Pittsburgh Testing Laboratory, Pittsburgh, Pennsylvania.

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Performance Tests for Traffic Zone Paint

The planning of purchases on the basis of actual performance rather than on specifications as to chemical content is reported by the Bureau of Purchases, California. Mr. J. F. Mispley, State Purchasing Agent of California, writes that, not having been able to obtain any specifications for traffic zone paint meeting his requirements, he has worked out a plan for actual physical test under road conditions.

> "The various bidders," he writes, "will be requested to submit a 10-gallon can, and will be permitted to apply a portion of it themselves, using strips about 12 in. wide across the highway; these strips will all be numbered and will be adjacent to each other and will face the same conditions in use. Some strips will be made on concrete and others on oil macadam. After a test of 60 to 90 days, the successful bidder will be awarded contract—the remainder of his 10-gallon can will be kept on file for a comparative chemical analysis, and a portion of it will be used in another comparative physical road test with the deliveries."

Committee Will Study Certification Plan Proposed by Bureau of Standards

The National Electrical Manufacturers Association has requested the American Standards Association to give consideration to the "Certification Plan" advocated by the Bureau of Standards to popularize the products which manufacturers certify to be in accordance with specifications. In a memorandum accompanying its request the National Electrical Manufacturers Association expresses the opinion, with regard to the certification plan, that

> "there is enough of possible advantage to permit the making of an attractive showing in its favor and to assure a popular appeal. Its application to bulk goods or general commodities for which the development of existing standards has not so far seemed either possible or desirable may well result in better grade, more per dollar and at least some of the assurance so much desired by the 'over-the-counter' purchaser."

On the other hand, the position taken by the N.E.M.A. is that there should not be any

> "extension of the certification plan in the commercial field and 'over-the-counter' buying, unless based on specifications or standards carrying the approval of the American Standards Association. Certification and labeling might lead to serious and widespread abuses unless adequate provision were made for 'policing.' Furthermore, if widely expanded, the procedure may well render exceedingly difficult the sale of brand goods whose acceptance by the public has been and must continue by reason of faith in the brand, built up and maintained by the expenditure of effort and money over long periods. While it may be true that some manufacturers are 'willing to certify' and at the same time advertise products superior to the specification, increased distribution cost must result and the feeling that 'if it is good enough for the government after test and trial, it is good enough for me,' will not only introduce sales resistance, but will force competition on 'government grade' materials on a price level which may make any other grade uneconomic and destroy incentive to improve. In the end, the public may or may not profit."

This request of N.E.M.A. was considered by the ASA Standards Council at its June 12th meeting, and more fully by the Board of Directors at its meeting the following day.

At the latter meeting President Serrill indicated that representatives of the American Home Economics Association had indicated to him that the Association was keenly interested in the subject, that home economists generally felt an urgent and increasing need for far more reliable information as to the quality of goods being made available to consumers, together with dependable grades, which they believed could only be made possible through the specification technique, coupled with labeling of goods.

The discussion in the Board centered largely upon the following questions:

(*a*) Are certification and labeling of goods as being in accordance with specifications desirable in general industrial purchasing and in "across-the-counter" goods?
(*b*) Are they feasible without explicit provision for policing?
(*c*) Is the trade association the proper agency for policing?
(*d*) Is it desirable that the movement furthering certification and labeling in various fields head up in an arm of the government?

It was decided that the ASA ought not to take any definite position on any of these far-reaching and interlocked problems, without a thoroughgoing study of the whole subject of certification and labeling by a committee. The appointment of such a committee by the President was authorized.

Italic Letters for Symbols

The Government Printing Office, on the recommendation and approval of the Permanent Conference on Printing, according to the Eighth Annual Report of the Director of the Budget for the fiscal year ending June 30, 1929, has accepted

> "the use of italics for all symbol letters—capitals, lower case, small capitals, and superiors and inferiors (exponents and subscripts)—and roman for arabic numerals. Letter symbols for chemical elements, and other terms, however, are to be in roman, in agreement with existing universal practice. This is in accord with a standardization procedure formally adopted by a committee of the American Standards Association, officially representing some 40 societies covering all branches of engineering and science, and through them representing industrial technology."

New A.S.T.M. Policy on Certification of Apparatus

Following the receipt of many requests for approval of specific apparatus as conforming to the standards of the American Society for Testing Materials, the Society decided several months ago that it would not be desirable for it to exercise such a function. It was felt by the executive committee of the Society, however, that appropriate committees might at times examine or advise on apparatus and encourage in every way the development and marketing of apparatus conforming to A.S.T.M. standards.

The following policies were, therefore, announced by the executive committee:

1. The Society in general will not formally approve or certify any specific testing apparatus as conforming to A.S.T.M. standards or tentative standards for that type of apparatus.

2. The Society will welcome inquiries or information about testing apparatus intended to conform to A.S.T.M. requirements for such types of apparatus and will, through the appropriate committees of the Society, point out significant departures, if any, from the Society's requirements. Where no such departures are found, it will be suggested that the manufacturer place his own guarantee on the apparatus that it meets the A.S.T.M. requirements for that type of apparatus.

3. It is suggested that purchasers of testing apparatus secure a guarantee from the manufacturer or dealer that apparatus purchased for use in making tests in accordance with A.S.T.M. requirements, either standard or tentative, conforms with the specified requirements for such apparatus; and that instances of failure of apparatus to conform with A.S.T.M. requirements when advertised or marketed as meeting such requirements, be reported to the Society.

Discussion of these policies with 25 of the leading manufacturers of testing apparatus indicated that these manufacturers were in general agreement with the policies.

Gas Engine and Compressor Guards

An outstanding need exists for standardization of gas engine and compressor guards in natural gasoline plants, according to Mr. G. B. Shea, in "Safety at Natural Gasoline Plants," technical paper 462 of the United States Bureau of Mines, as reviewed in the *National Petroleum News* for February 12, 1930. Mr. Shea suggests, according to the *News*, that the manufacturers of compressors furnish standard protective equipment as an integral part of the compressor units they sell.

Recommend New Practices for Watch Manufacturers

An illustration of the difficulty of carrying on business, even in the luxury articles, without well-established standards as a plane of reference for quality of product, is seen in the following, taken from the *New York Times* for May 25, 1930.

> "Revival, in a modified form, of the practice of stamping time guarantees of wearing quality in watch cases is being sought by the National Watch Case Manufacturers' Association in a petition filed with the Federal Trade Commission. Seven years ago the organization took the initiative in abolishing the practice, believing that the substitution of a standardized marking such as 'gold filled' would eliminate many of the abuses which grew up under the old form and establish in the public mind a single standard similar to the term 'sterling' as applied to silver.
>
> " 'In actual practice,' according to Alexander Vincent, secretary of the organization, 'we found that the move was met by manufacturers who sought to evade the regulations by having all sorts of additional marks, stamps, and other designations which prove confusing to the consumer.'
>
> "Under the new plan, a system of standardized time guarantees, which will set up minimum quality standards on which guarantees of 15, 20, and 25 years may be made, is sought."

This trade evidently believed that its problems could be solved by abolishing such crude standards as it had, rather than by clarifying and reformulating them so that they became definite, workable, and specific, and so capable of being dealt with effectively by internal regulation in the trade or by governmental intervention, as the particular case might seem to require. The case seems to illustrate that which hardly requires formal proof, namely, that an article which is sold in several qualities must in the long run be referable to specific standard and that in the absence of those standards loose and vague systems of grading, accompanied by trade irregularities and misrepresentation, will tend perforce to arise. (There are, for example, in the New York wholesale egg market, no less than 59 grades of eggs, many practically indistinguishable and on the whole confusing to all concerned, which if developed on a scientific basis would probably reduce to not more than six—whereas under the state egg grading act even as few as three proves from the standpoint of the ultimate consumer to be a workable system.)

New Enactments Affect Construction Code Violators

New Jersey is the first state to pass a detailed construction law governing the protection of employees of contractors and containing drastic penalties with jail sentences for violators. The act contains safety provisions for all branches of the construction industries, providing in conclusion that:

> "Any person who shall violate any of the provisions of this act, shall, upon conviction thereof, be punished by a fine of not less than twenty-five or more than one hundred dollars, for the first offense; and, for the second offense, may be sentenced to confinement in the common jail of the county where such conviction is had, for a period of ten days; and, for the third and each succeeding offense, may be sentenced to confinement in the common jail of the county where such third and/or succeeding conviction is had, for a period of thirty days.
>
> "Any officer of any corporation which shall violate any of the provisions of this act, shall be personally liable for such violation of such corporation, and upon conviction thereof shall be fined or imprisoned as herein provided.
>
> "Any manager, superintendent, owner, foreman or other person in charge of any building, construction or other place, in which this act is violated shall upon conviction thereof, be fined or imprisoned as herein provided."

Other provisions of the act give jurisdiction to try violators to police magistrates, recorders, justices of the peace, and others having criminal jurisdiction where the violation occurred. Complaints may be sworn to by any person having knowledge of the facts, except, however, that a commissioner of labor or any employee of his department may make a complaint upon information and belief.

Army Specifications Available

The United States Army has issued a revised list of specifications. This list covers several thousand items purchased by the various divisions of the Army. Many specifications for materials are of interest to industries working out their own specifications for similar materials. Sustaining-Members interested in the specifications may borrow a copy of the list and also copies of the specifications through the ASA Information Service.

Nonacid Flux

The Army has recently issued specifications for nonacid flux to be used in Ordnance Department work that may be of interest to Sustaining-Members, particularly those in the field of electrical manufacture. This is an acid-free flux, which is a homogeneous mixture of the consistency of petrolatum, having a general composition as follows:

Petrolatum	65 ± 10 per cent
Ammonium chloride	3.5 ± 1.5 per cent
Zinc chloride	25 ± 5 per cent
Water	6.5 ± 3.5 per cent

Detailed specifications (No. 83–12, September, 1929) are available through the ASA Information Service, on request. They provide for methods of test and inspection.

Navy Standard Boiler Compound

The Navy has recently issued a specification for boiler compound of the type composed of sodium carbonate (76 per cent, anhydrous, Na_2CO_3); trisodium phosphate (10 per cent, $Na_3PO_412H_2O$); starch (1 per cent); and sufficient cutch or dry extract of hemlock, oak, or chestnut bark (not dry extract of quebracho) to yield 2 per cent of tannic acid—the remainder to be "water and only such impurities as are common to the ingredients"—; the material to be intimately mixed and finely powdered.

Methods of sampling and analysis are specified. This specification, 13C3e supersedes 13C3d of January 3, 1928.

New Sustaining-Member

The Goodman Manufacturing Company, manufacturer of electrical mining machinery, has become a Sustaining-Member of the American Standards Association since the publication of the list of Sustaining-Members in the 1930 American Standards Year Book.

Czech Leather Belting Specifications

Copies of a translation into English of Czechoslovakian specifications for chrome leather belting are available for loan through the ASA Information Service. These specifications have been made available in English through the courtesy of the American Leather Belting Association, which is cooperating on the ASA project of Specifications for Leather Belting (B42).

Simplification Project Will Save Millions for Customers

An annual saving to the public of $5,500,000 will result from the adoption of the Simplified Practice Recommendation for Range Boilers and Expansion Tanks (No. R8-29), according to the estimate of the Bureau of Standards publication containing the recommendation. The recommendation was adopted under the auspices of the Simplified Practice Division of the United States Department of Commerce. The following statement is quoted from the publication:

> "The industry believes that this recommendation will result in more saving to the consumer, less cost of installation, greater economy of fuel, with increased heating efficiency. One effect will be a reduction in the cost of installing and connecting a coal or gas water heater to the range boiler. The standard boiler sizes and tappings make it possible for plumbers and gas companies to cut the pipe in their own shops instead of on the consumer's premises and to complete the entire job in about one-half the time formerly required, thereby effecting a great saving to the consumer on every boiler placed in service. Estimating the sale of new boilers during the next 12 months at $1,000,000 (a conservative figure, according to the manufacturers), it is calculated that the immediate saving to the public will be $4,000,000. There must also be added to this initial saving another $1,500,000, representing a secondary saving in fuel consumption resulting from increased heating efficiencies made possible by the new standards, according to engineers of the American Gas Association. The total annual saving to the public, therefore, may be about $5,500,000."

Nominating Committee Appointed

At a meeting of the Standards Council held July 29, 1930, the following were appointed as members of the Nominating Committee to nominate officers for the Standards Council for 1931: A. W. Whitney, Associate General Manager, National Bureau of Casualty and Surety Underwriters, chairman; C. E. Skinner, Westinghouse Electric and Manufacturing Company; A. A. Stevenson, ASA representative on the Planning Committee of the Division of Simplified Practice, Bureau of Standards; E. C. Crittenden, Chief Electrical Division, Bureau of Standards; C. B. Veal, Assistant General Manager, Society of Automotive Engineers.

New ASA Member-Body

The Radio Manufacturers Association, which has been actively engaged in standardization work for some time, has become a Member-Body of the American Standards Association. This affiliation is expected to aid considerably the establishment of authoritative national standards for radio apparatus. Mr. Ray Manson, vice-president and chief engineer of the Stromberg-Carlson Telephone Manufacturing Company, will represent the Radio Manufacturers Association on the ASA Standards Council.

Mr. Morris Metcalf, American Bosch Magneto Corporation, Springfield, Massachusetts, is president of the Radio Manufacturers Association; Mr. Bond Geddes, executive secretary of the Radio Manufacturers Association, 11 W. 42nd Street, New York City, is also executive vice-president; and Mr. M. F. Flannigan, executive secretary of the Radio Manufacturers Association, 32 W. Randolph Street, Chicago, Illinois, is secretary.

C.E.S.A. Year Book

Copies of the 1929 Year Book issued by the Canadian Engineering Standards Association were recently received at the ASA office and are available for those interested. Some of the projects in the C.E.S.A. Year Book of special interest to American industry are:

A-1-1928—Standard specifications for steel railway bridges
A-1a-1928—Material specifications for steel railway bridges
A-6-1929—Standard specifications for steel highway bridges
A-16-1924—Standard specifications for steel structures for buildings
A-23-1929—Standard specifications for concrete and reinforced concrete
B-12-1924—Standard specification for galvanized steel wire strand
C-2-1929—Standards for single-phase distribution transformers
C-3-1924—Standard specification for galvanized telegraph and telephone wire
D-11-1924—Interim report on manufacture, testing and use of gasoline
G-28-1929—Standard specifications for carbon steel castings

Greek Standardizing Body Planned

The establishment in Greece of a national standardizing body to be modeled after the German body (Deutscher Normenausschuss) is now being considered. It is planned to establish national standards for material manufactured in Greece. Foreign standards will be used, however, for imported materials.

Governmental Officials Approve ASA Code Work

The importance of ASA safety codes in the national safety movement was affirmed at the May Convention of the Association of Governmental Labor Officials in Industry in the report of a committee appointed the previous year to investigate the use of national codes by state regulatory bodies. The appointment of the committee was a result of the address by Lewis DeBlois, Director of the Safety Engineering Division of the National Bureau of Casualty and Surety Underwriters, which was reprinted in the last issue of the ASA BULLETIN. While asking for an additional year to complete its work, the committee presented a report which was unanimously approved by the convention. The report said in part:

> "It is very evident that no State Legislature will be induced to enact safety laws of the right kind unless there is presented to it some definite, logical, and workable plan to be adopted and followed, which would make the laws effective. Therefore, the officials of each state are urged to study the procedure in all of the states, and out of the fund of practical experience, formulate a plan that will make effective its own safety program.
>
> "In the formulation of safety regulations and the adoption of specific safety devices, your committee suggests and urges the consideration of the various safety codes adopted by the American Standards Association, known as the 'National Safety Codes.' These constitute the best thought and judgment of the foremost safety engineers and experts in accident prevention work in the United States. Sixteen of these codes have been published as bulletins by the Bureau of Labor Statistics and are available upon request."

Standards Interest Convention

"In the several section meetings standards appeared to be the center of interest. These standards dealt with mechanical simplification and mechanical details in some apparatus and with voltage ratings and clearances in others. Circuit breakers, motors, disconnect switches, fuses, inclosed switch-gear, and other apparatus offer opportunity for a greater degree of standardization."

From a review of the 1930 convention of the National Electrical Manufacturers Association, in the Electrical World, May 24, 1930.

New Members of Standards Council

Mr. Alfred J. Jupp, Vice-President of the Lukenheimer Company, Cincinnati, Ohio, has been appointed to represent the Manufacturers Standardization Society of the Valve and Fittings Industry on the Standards Council of the American Standards Association. Mr. Arthur M. Houser, Engineer of Product, Crane Company, Chicago, Illinois, has been named as Alternate for Mr. Jupp on the Council. The affiliation of the Manufacturers Standardization Society of the Valve and Fittings Industry with the American Standards Association as a Member-Body was announced in the July issue of the ASA BULLETIN.

Structural Metal Painting

A pamphlet on structural metal painting, including formula and specification material of interest to all concerned with the protection of metal structures, can be had without charge from the National Lead Company, or can be obtained through ASA. Some of the chapter headings of this 80-page booklet prepared by Dr. A. H. Sabin, a distinguished paint technologist, are as follows: Theories of Corrosion; Technical Considerations; Pigment and Oil Proportions; Paint Materials; Various Types of Paint Work; Estimating; Cleaning Surfaces; Mixing Red-Lead Paint; Painting Specifications; Formulas; Weights and Specific Gravities.

Standard German Gas Mask Colors

The German national standardizing body has adopted designating colors for filters of gas masks so that the masks may be distinguished with regard to the kind of gas against which they give protection. The color scheme in question has been taken over from the German Auer Incandescent Gas Light Society as follows:

Type	*Color*	*Protection against*
A	Brown	Organic vapors
B	Gray	Acid gases
D	Grayish yellow	Dust
E	Yellow	Sulphur dioxide
F	Red	Combustion gases
I	Blue-brown	Cyclone B
K	Green	Ammonia
L	Yellowish red	Sulphuretted hydrogen

Designating letters and colors adopted by other organizations are frequently different from those given above, for example, those of the Mine Safety Appliance Company, Pittsburgh. The recommendation is made that for this reason due attention should be paid to the designation placed on the filters, and also that efforts should be made to arrive at international uniformity.

ASA PROJECTS

Standard for Transmission Chains and Sprockets

The American Standard for Transmission Roller Chains, Sprockets, and Cutters (B29) developed by the sectional committee under the sponsorship of the Society of Automotive Engineers, The American Society of Mechanical Engineers, and the American Gear Manufacturers Association has been approved by the American Standards Association.

The standard covers roller chains, sprockets, and cutters, commonly used for the transmission of power in industrial machinery, machine tools, motor trucks, motor cycles, and tractor drives, and similar applications.

According to the foreword to the standard:

> "The sizes, dimensions, and other data are for standard steel chains that are considered suitable for all usual applications. Adoption of the standard does not indicate that other chains will not be obtainable for use where they may be required. It is recommended by the sectional committee that chain manufacturers be consulted by users in their selection of chains for given applications in order to obtain the best results in operation."

Copies of these standards are now available and may be obtained through the ASA Information Service for fifty cents per copy.

Request Standardization of Foundry Equipment

The organization of a technical committee to undertake the standardization of foundry equipment under the auspices of the American Standards Association has been jointly requested by the American Foundrymen's Association and The American Society of Mechanical Engineers. The request will be passed upon at the next meeting of the Standards Council early in September.

The American Foundrymen's Association would include in the project the standardization of such foundry equipment as pattern plates and molding machine parts affecting interchangeability of patterns, flask pins, and holes, general dimensions of flasks for jobbing work, ladle and ladle shank sizes, ladle sleeves, stoppers and nozzles, stock core print sizes, shapes and finish allowances, pattern markings, rapping plates, fillet sizes, and dowel pins for metal patterns and metal core boxes.

The American Foundrymen's Association has already standardized the color markings for foundry patterns. Its report on this subject, published in 1926, has been widely accepted.

The American Foundrymen's Association has in the past sponsored two projects under ASA procedure. These were the safety code for the protection of industrial workers in foundries (B8-1922) and the standards for outside dimension of plumbago crucibles for non-tilting furnaces in non-ferrous foundry practice (H13-1925).

A number of projects for the standardization of foundry products have been approved or are now under way under ASA procedure. Among these are projects covering cast iron pipe, and man-hole frames and covers.

New ASA Standards for Symbols Available

Navigational and Topographical Symbols (Z10h-1930) and Symbols for Photometry and Illumination (Z10d-1930) have been formally approved as American Tentative Standard and American Standard, respectively, by the American Standards Association on recommendation of the American Association for the Advancement of Science, American Institute of Electrical Engineers, American Society of Civil Engineers, Society for the Promotion of Engineering Education, and the American Society of Mechanical Engineers, the joint sponsors for the projects.

The navigational and topographical symbols submitted by the sectional committee on Scientific and Engineering Symbols and Abbreviations are a slight revision of the symbols previously used by the Federal Board of Surveys and Maps and those shown in the War Department Training Regulations for 1924, while the symbols for photometry and illumination are a modification of those given in the American Standard Illuminating Engineering Nomenclature and Photometric Standards (Z7-1925).

These symbols are part of a comprehensive program for unification of graphical symbols, symbols for quantities in equations and formulas, and of abbreviations as used in engineering and scientific reports, tables, publications, and so forth, but not including definitions of terms used in engineering and scientific practice.

There is now pending before this Association a proposed standard on "Graphical Symbols for Use in Radio Communications."

Report on Vacuum-Tube Base Standards Available

A preliminary report on vacuum-tube base standards dated June 2, 1930, prepared by the sub-committee on vacuum tubes of the sectional committee on Radio (C16) of the American Standards Association, has been received.

The report covers sizes and tolerances for the following types of bases:

small standard UX base
large standard UX base with bayonet pin
large standard UX base without bayonet pin
standard five prong UY base
fifty watt transmitting tube base
three-pin large transmitting tube base
plate cap for transmitting tube
cap for receiving tubes

In addition, standard methods for connecting the elements of the various types of tubes to the pins of appropriate bases are given.

Copies of the report may be obtained through the ASA Information Service.

Suggestions and comments on these standards will be appreciated and should be addressed to the Technical Committee on Vacuum Tubes, Sectional Committee on Radio, Room 802, 33 West 39th Street, New York, N. Y.

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Committees Report Progress on Zinc Coatings Standards

The proposed American Standard Specifications for Zinc (Hot-galvanized) Coatings on Structural Steel Shapes, Plates, and Bars, and their Products (G8c), developed by Technical Committee 3 of the sectional committee on zinc coating of iron and steel, has been approved by the sectional committee and is now before the American Society for Testing Materials, sponsor for the project, for formal approval.

The proposed specifications are revisions of the A.S.T.M. Specifications A123-29T, provision having been made to cover tentatively the much debated subject of embrittlement pending further research on the subject.

These specifications, together with a complete statement regarding their development, have been published by the sponsor during the past year with the report of the sectional committee. Copies of this report are available and may be obtained through the sponsor or through the ASA Information Service.

Technical Committee 2 on Zinc Coating of Sheets and Sheet Products (G8b), of which Mr. G. A. Reinhardt of the Youngstown Sheet and Tube Company is chairman, has approved the specifications for zinc coating of iron and steel sheets which were published in 1927 by the A.S.T.M. for review and criticism. The sectional committee, in consideration of the technical committee's recommendation, is now planning to convene to discuss the proposed American Standard Specification and take formal action.

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Final Draft of Standards for Insulator Tests Prepared

The final draft of the proposed standards for insulator tests prepared by the sectional committee on Power Line Insulators for Voltages Exceeding 750 (C29) has been submitted for approval as American Standard by the sponsors, the American Institute of Electrical Engineers and the National Electrical Manufacturers Association.

These standards are not to be interpreted as forming complete insulator specifications, but rather as defining the methods for making the various tests described. The standards are divided into the following divisions: scope and purpose; definitions; payment for material tested; testing equipment and methods; design tests-pin insulators; design tests-suspension insulators; routine tests-pin insulators; routine tests-suspension insulators; appendix-variation of wet flashover voltage with water resistance.

All of the material contained in these standards is based upon and is a complete revision of the A.I.E.E. Standard number 41—Insulator Test Specifications.

The standards have been referred to the Electrical Advisory Committee of ASA for submittal to the ASA Standards Council.

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Draft of Piping Standards Available for Review

A draft of the proposed standard for fabrication of hangers, supports, anchors, sway bracings, and vibration dampeners is being circulated for review and criticism, and copies are available, for those interested, through the ASA Information Service.

The draft was prepared by a sub-committee under the chairmanship of W. S. Morrison of the ASA technical committee on code for pressure piping. This project is under the sponsorship of the American Society of Mechanical Engineers.

Natural Resistant Factors to Material Specification Development

by

O. B. Zimmerman[1]

It might be valuable to note the following points which have to be tactfully considered in connection with the development of a materials specification:

Within the Company

1

Any material specification must be set up to meet the broad viewpoint of the special interest, low cost, and suitability to the purpose from the viewpoint of the company as a whole, and it must not be set up on a narrow viewpoint of any individual member or an individual group of special interest within the company.

2

Resistance to change in specification often comes from an unwilling attitude to go through the labor of such change, even though it be known to be desirable from the company's standpoint.

3

There is often a real lack of appreciation of the value of specification work which results in an unconscious resistance to or an attitude of indifference toward such specifications.

4

The interest of all department heads who are interested should be definitely shown, otherwise subordinates let down or even belittle the work. This factor is very important to insure speed and success of operation under such specifications.

Outside of the Company

1

Suppliers often resist the development of a materials specification because their products were developed individually and they do not wish to change their methods, standards, tolerances, equipment, definition, or material. They also are at times compromised by their patents for process of manufacture and hence do not wish to change.

A good example of this influence was that of our specification on roller chain, in which we had four suppliers with different products which were not interchangeable, naturally, only through a long process of pressure, reasoning, and research was this brought about in the end; however, all were thoroughly interested in this problem. This type of resistance has oftentimes caused long delay in the final issuance of a specification, but the advantage when thoroughly done resulted in the elimination of difficulties all along the line which formerly prevailed.

General

In the maintenance of a series of specifications, particularly within the last few years, it has been necessary to revise these specifications owing to the rapid changes which have taken place in metallurgical lines. Marketing conditions, manufacturing equipment, processing of the material have all entered into this problem, hence to get the best product at the least cost these factors have influenced the revisions which were necessary.

[1] Mr. Zimmerman is affiliated with one of the country's largest manufacturing companies, and is well known in the national standardization field.

Refrigerator Standardization

The Westinghouse Electric and Manufacturing Company, in announcing their entrance into the field of electric refrigerator manufacture, state that all models of their new refrigerators have a standard height of 60 inches and a standard depth of 27 inches. Only the width is varied in the different size models. To permit a maximum degree of interchangeability, the refrigeration units are built in only two sizes.

Risk Involved in Inspection by Sampling

A valuable article on inspection by sampling is included in the December, 1929, issue of the *Bell Laboratories Record*, a copy of which may be borrowed, through ASA, by those interested.

The author of the article, H. F. Dodge, declares that

> "It is seldom economical to produce material which conforms one hundred per cent with all requirements. In many of the internal stages it may cost less, all things considered, to turn out material in which a large majority of the pieces fall within the engineering requirements, and then to depend on inspection or subsequent assembly steps to weed out the few slightly defective ones. How much defective material can economically be passed along, depends on the relative costs of weeding out defects by two different methods; by inspection on the one hand and during subsequent assembly or installation processes on the other. If the average percentage of defectives turned out in one of the earlier stages of production is held quite low, the segregation of the defective pieces can often be done most economically by the operatives in the subsequent processing stage, and the intermediate inspection can be conducted on a sampling basis to eliminate any lots of distinctly subnormal quality.
>
> "When only a sample is taken, the true quality cannot be discovered. Sampling inspection involves taking chances, for according to the laws of chance a sample will occasionally err seriously and make a bad batch of product appear quite satisfactory. Chance plays no favorites, of course, and will just as readily make good product appear bad."

Mr. Dodge points out that in some cases it is necessary to recognize that chances must be taken, "it remains only to regulate and control them by agreeing at the start what order of magnitude of risk may economically be taken." The balance of the article is a description of the degree of risk involved in inspection by sampling.

German Heating Practices Codified

"Rules for Calculation of Heat Requirements of Buildings and for Calculating Dimensions of Boilers and Radiators of Heating Plants," a fifty-four page book, has been published by the German national standards body and is available through the ASA Information Service.

Paper Producer Recognizes Standardization Savings

A recent advertisement in the *Literary Digest* makes definite reference to the recognized savings that are produced through standardization. The program of the S. D. Warren Company, manufacturers of printing paper,

> "starts with producing better papers in volume at low production costs. Furthermore, it includes a plan for cutting the cost of printing through a simplification of the number of paper sizes formerly held necessary.
>
> "In addition, many of the uncertainties of presswork and printing are overcome through a series of scientific tests of each run of Warren's Papers. These tests, made at the mill, insure standardization of printing, folding, and binding qualities.
>
> "The result is better printing on better paper at lower costs to printers and buyers of printing."

It may be that this advertisement is an indication that the paper industry, which has so long lacked the extensive and coordinated development of the testing technique which characterizes other mass production industries of corresponding importance and magnitude, will shortly emerge into a period where it will avail itself of the benefits of standardization and will call attention to these benefits in its sales literature. Evidence in this direction is seen in the pioneer work of the American Writing Paper Company, already commented on in these columns, and in the broad program of standardization of paper quality very recently undertaken under the auspices of the Bureau of Standards.

Study of Committee Work

The ASA has available for loan to interested trade associations and other groups a paper entitled "Committees, Their Purposes, Functions and Administration," by John J. Hader and E. C. Lindeman, who have been carrying on for the past several years a study of the fundamental methodology with particular reference to the reasons for the success and failure of committee work. While this is a difficult topic to deal with by the scientific method, it is plain enough that its political and social significance is so great as to warrant a careful attempt to set down the basic principles underlying the committee organization in industry and inter-industry groups. The pamphlet is published by the American Management Association and sold at 75 cents a copy.